REMARKS

Restriction has been required to one of the inventions defined as:

Group I, claims 1-34, drawn to a thermoform process, classified in Class 264, subclass 45.1+;

and

Group II, claims 35-48, drawn to a headliner, classified in Class 442, subclass 35.

Applicants confirm their provisional election of the invention of Group I, and withdraw the claims of Group II from the application, subject to their right to file a divisional application thereon, or take other appropriate steps to protect the invention lying within the claims of Group II. The withdrawal of Group II claims does not change the inventorship.

The Examiner, under 35 U.S.C. 119(e), finds insufficient evidence in the priority document to support claims 14, 17, and 23-32. Examiner finds insufficient evidence to support secondary punching, laser, water-jet cutting and ultrasonic and hot plate welding, as claimed in claims 30 – 32.

Applicants' provisional patent application teaches, in Fig 11, that doghouses can be formed, cut apart and then vibration welded. Vibration welding is a type of ultrasonic welding, and punching, laser, water-jet cutting are types of cutting. Therefore, Applicant submits that claims 30–32 meet the 35 U.S.C. 119(e) requirements, and that these claims should be accorded priority.

The Examiner has rejected claim 1, under 35 U.S.C. 112 as being indefinite. The part formed from the second sheet is referred to as a "first headliner part," and it should be "second headliner part."

Applicants have amended claim 1 to correctly read "second headliner part." Applicants thank the Examiner for identifying this typographical error.

Claims 2 and 3 stand rejected under 35 U.S.C. 112 as being indefinite. The Examiner takes the position that low pressure thermoplastic composite is indefinite. Revision of the claims is required.

The term "low pressure" is an industry term indicating that the composite was compressed using relatively low pressures, and these composites are typically less dense than a similar composite compressed under high pressures. Applicants have amended claims 2 and 3, adding a definition,. --- where said low pressure composite has a flexural modulus of about 900 MPa to about 1800 MPa as determined by ASTM D792 ---. Support for the definition can be found in the specification on page 14, lines 8–9.

The Examiner has rejected claims 9, 21, and 22 under 35 U.S.C. 112 as being indefinite. The phrase "such as" makes it unclear whether the limitations following the phrase are part of the claimed invention.

Applicants have amended claims 9, 21, and 22 deleting the phrase "such as".

Claim 28 is rejected because there is insufficient antecedent basis for "reinforced scrim".

Claim 28 is amended deleting "reinforced scrim." The amended claim now reads "second headliner," for which there is antecedent basis.

Claims 30-32 stand rejected under U.S.C. 112. The phrase "as needed" renders the claim indefinite because the claim does not set forth under what conditions the steps are needed.

Applicant takes exception with the Examiner's analysis, because in a manufacturing process, not all steps are always needed. For instance, the end-user (e.g., customer) may specify that certain steps are not to be performed for various reasons, or process conditions are not completely under control of the manufacturer. In some instances, the steps are required, but in others, they are not. A real example illustrates an

"as needed" situation. Many manufacturers use interruptible natural gas for their IR heaters. The gas company can stop supplying natural gas depending on their total demand. To accommodate for the interruption a manufacturer will keep a backup supply of propane, which stores more densely than natural gas. When the natural gas flow is cut the manufacturer switches to propane. Propane typically burns at lower temperatures until the heaters are tuned for the propane, and the resulting product may require more finishing steps including secondary punching, laser, water-jet and knife trimming, and vibration, ultrasonic and hot plate welding. The finishing steps are on an "as needed" basis, and therefore are sometimes required, and at other times not required. The necessary extra steps are not process steps the manufacturer routinely performs, but real life problems occasionally force the extra steps; and even with the extra steps, the manufacturer makes more money than stopping the operation.

Claims 1, 20, 23, 24, 30, 33 and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop (U.S. Patent 4,529,641) in view of Breezer (U.S. Patent 5,635,129), Byma (U.S. Patent 6322658), Steward (U.S. Patent 4211590), Haardt (U.S. Patent 5,180,628), Corpe (U.S. Patent 5,795,015), and Official Notice. Regarding claim 1, Holtrop teaches a thermoforming process for a headliner. Holtrop is silent to: a) an oven for heating the first and second sheets to predetermined temperatures, b) frames holding the first and second sheets, c) thermoforming the first and second sheets onto half molds prior to fusing regions of the headliner parts, d) the interior compartment having impact cushioning, e) ejecting the unified part, f) trimming the unified part, and g) finishing the unified part.

Applicant claims vacuum thermoforming one sheet and then a second sheet, and then compression molding the two parts. Holtrop teaches, col. 4, line 62 – col. 5, line 5, "The preheated laminate is then inserted into a thermoformer where a source of pressured gas, for instance air, is connected to the blow pin and mold blocks close on to those portions of the laminate to be adhered between the two layers of foamed thermoplastic. The mold can shape the laminate into a three-dimensional shape which is hollow at certain locations within its periphery, as illustrated in the cross-sectional view of Fig. 2. In some instances it is also advantageous to apply vacuum to the mold cavities to assist in

expanding non-adhered sections of the foamed thermoplastic layers." Applicants' process, as claimed in claim 1, does not teach first forming a laminate, and then using air pressure to expand the laminate. Applicants' claim vacuum thermoforming the individual sheets, and then compression molding the separate parts forming a unified part. Holtrop only teaches that a vacuum can be used to assist air pressure in expanding the laminate. Applicants' invention is obviously superior in that Applicants' process can produce a laminate (unified part) that can be open on the edges, whereas Holtrop relies on . pressurized air, and only laminates that are sealed can be pressurized. Applicants have a lot more flexibility in shaping the unified part than the process as taught by Holtrop, and Applicants' claim 1 is not anticipated by Holtrop. Examiner states that: a) Byma teaches an oven (3:66) for heating a first and second sheet to predetermined temperatures (Fig. 4) for thermoforming headliner parts to obtain optimal compression and bonding of the layers (2:1-4).

In contrast to Byma, Applicants teach a stepwise process for vacuum forming, and in claim 1 there is only a single sheet per step. Byma teaches compression molding multiple sheets. Applicants' step of compression molding only occurs after vacuum thermoforming, and there is no heating step to a predetermined temperature step following vacuum thermoforming.

Examiner states that b) Steward teaches (6:40-49) use of tenter frames during a preheating step prior to thermoforming a headliner to avoid shrinkage and surface irregularities.

Applicants teach a sequential vacuum thermoforming process for twin sheets, where the tenter is used to not only stabilize the sheet during heating, but to convey a first sheet to the bottom half of the mold, and convey a second sheet to the top half of the mold. Steward does not teach the claimed use of frames. Steward teaches a "restraint that is a clamping fixture, such as a tenter frame," col. 6, lines 47-49. He does not teach it used as a conveyor of product to the mold.

Examiner states that: c) Breezer teaches a thermoform process to form thermoformed articles with portions of significantly greater thickness than the combined thicknesses of the sheets from which the article is formed (2:35-39) comprising the steps of: holding a first sheet along its edges (Fig. 6, Item 34); heating the first sheet (3:39-41); transferring and molding the first sheet onto a half mold of a vacuum thermoforming mold forming a first part (3:38-47); holding a second sheet along its edges (Fig. 6, Item 30); heating the second sheet (3:49); transferring and molding the second sheet onto an opposing half mold of the vacuum thermoforming mold forming a second part (3:48-50); compressing the half molds of the thermoforming mold fusing regions of the first part to the second part (3:50-54), thereby forming a unified part having at least one interior compartment (Fig. 6).

Applicants' claim 1 claims "a unified part having at least one interior compartment having impact cushioning". Breezer does not teach forming a cavity except as a means of adding reinforcing thermoplastic material 48. In col. 5, lines 28–31 reads, "To achieve reinforcement a quantity of heated liquid thermoplastic material 48 is injected under pressure into the cavity 50 between the first and second sheet by an injector inserted through passage 51." Breezer does not teach a headliner, nor the more general concept of twin sheets with a cavity within. Breezer's invention addresses the issue of thin points formed during vacuum thermoforming that may need reinforcement col. 4, lines 39-33. Breezer does not teach the use of a tenter to convey a first sheet to the bottom half of the mold, and convey a second sheet to the top half of the mold.

The Examiner takes Official Notice (d) that interior cavities are well known to provide impact cushioning. One common example available at the time of the invention would have been tennis shoes with interior air compartments for impact cushioning. The Examiner also takes the position that the thermoformed laminate taught by Holtrop would inherently have had impact cushioning because it contains interior cavities (Fig. 2), as sought by Applicant.

Applicants take exception to the Examiner's Official Notice. Interior cavities provide impact cushioning for a head. For instance, in U.S. Patent 5,348,798 to Berghuis

et al., Berghuis et al. teach an automobile bumper formed from moldable plastic sheets having a cavity that is formed when ice 26 melts. A tennis shoe has, as taught in U.S. Patent 5,987,779, an inflatable bladder. In the instant application the interior compartment having head impact cushioning is not pressurized, and is not a structural element suitable for an automobile bumper. The thermoformed laminate taught by Holtrop is a laminate of foam sheets, provides improved acoustic properties, col. 5, line 25. The Holtrop laminate is substantially a corrugated part, where the corrugations impart strength to the laminate. As pointed out in col. 5, line 24 – 28 of Holtrop, "the headliner is hollow in the locations between roof support ribs and formed to closely conform to the interior surface of the automobile." The Examiner's analysis does not match the stated purpose of the hollow cavities. The rejections based on the Official Notices are respectfully overcome. Cited references are attached.

The Examiner cites e) Haardt, who teaches ejecting a composite laminate part (4:55-56).

Applicants teach ejecting a unified part formed by vacuum forming and compression, where the unified part has at least one interior compartment having head impact cushioning. Haardt teaches a foam filled laminate that is hot molded, and then cooled. Applicants' process does not claim an ejector, but the process of ejecting. An ejector is typically some type of pushing device. The applicants' invention utilizes a frame, and when the mold is opened the sheet attached to the frame is pulled (ejected) out of the mold. Per se, there is no ejector.

The Examiner cites f) Corpe, who teaches (6:44-49) trimming.

Applicants teach trimming a unified part that has at least one interior compartment having head impact cushioning. Corpe does not teach trimming this type part. Claim 1 should be allowed in view of the amendment to claim 1, and the arguments set forth above.

Claim 20 stands rejected by the Examiner. Holtrop teaches a headliner part (5:24). Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the

time of the invention using the process of Holtrop, Byma, Steward, Breezer, Haardt, and Official Notice to use the product as a headliner.

Applicants' claim 20 claims a headliner using a thermoform process, as claimed in claim 1. The arguments set forth for claim 1 establish that claim 1 is not prima facie obvious, and therefore the dependent claim 20, which has all the limitations of claim 1, is not obvious. Claim 20 should be allowed, based on the limitations of the parent claim 1.

Claim 23 stands rejected by the Examiner. Holtrop teaches injecting foam into the interior compartment (5:15-21). Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention.

Applicants claim in claim 23 that after compressing the half molds of the thermoforming mold fusing the first headliner part to the second headliner part thereby forming a unified part; injecting foam into the interior compartment. In Holtrop's invention the laminate has not been expanded at this point in his process, and Holtrop has no cavity.

Claim 24 stands rejected by the Examiner. Holtrop teaches injecting foam, but is silent to injecting "insulation" or to the foam acting as insulation. The Examiner takes the position that it would have been obvious to one of ordinary skill in the art that the foam taught by Holtrop (5:15-21) would have acted as thermal and sound insulation. Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to inject insulation into the interior compartment because doing so would reduce noise within the passenger compartment.

Applicants' argument is the same as for claim 23. See Holtrop col. 3, lines 60-63. Applicants claim in claim 24 that after compressing the half molds of the thermoforming mold fusing the first headliner part to the second headliner part thereby forming a unified part; injecting insulation into the interior compartment. In Holtrop's invention, the laminate is formed first and then expanded. When the half molds are initially compressed,

Holtrop's laminate has not been expanded. Holtrop has no cavity to which insulation can be added.

Claim 30 stands rejected by the Examiner. Holtrop is silent to the specific finishing treatments sought by Applicant. Corpe teaches (6:44-49) water-jet cutting. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to include a step of water-jet cutting to improve the overall appearance of the headliner, to remove it from the framed sheets, and make it fit into the vehicle.

Applicants teach finishing a unified part that has at least one interior compartment having head impact cushioning. Corpe does not teach finishing this type part. Claim 30 should be allowed in view of its dependency on the now amended claim 1.

Claim 33 stands rejected by the Examiner. Holtrop teaches preheating the first sheet (4: 59-63). Byma teaches an oven (3:66) for heating a first and second sheet to predetermined temperatures (Fig. 4) for thermoforming headliner parts to obtain optimal compression and bonding of the layers (2:1-4). Steward teaches (6:40-49) use of tenter frames during a preheating step, prior to thermoforming a headliner to avoid shrinkage and surface irregularities. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the oven of Byma for obtaining optimal compression and bonding of the layers and the tenter frames taught by Steward to avoid surface irregularities and shrinkage with the method of Holtrop, Byma, Steward, Breezer, Haardt, and Corpe to achieve the same benefits.

Applicants' claim 33, taken with claim 1, teaches a two-step process of heating a first sheet. In addition to claimed heating step of claim 1, there is an additional preheating step. Claim 33 states "after placing a first sheet in a first frame and transferring the first sheet into a preheat oven; preheating the first sheet." Neither Holtrop, Byma, Steward, Breezer, Haardt, nor Corpe teach the benefits of a two step heating process.

Claim 34 stands rejected by the Examiner. Holtrop teaches preheating the second sheet (4: 59-63). Byma teaches an oven (3:66) for heating a first and second sheet to

predetermined temperatures (Fig. 4) for thermoforming headliner parts to obtain optimal compression and bonding of the layers (2:1-4). Steward teaches (6:40-49) use of tenter frames during a preheating step prior to thermoforming a headliner to avoid shrinkage and surface irregularities. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the oven of Byma for obtaining optimal compression and bonding of the layers and the tenter frames taught by Steward to avoid surface irregularities and shrinkage with the method of Holtrop, Byma, Steward, Breezer, Haardt, and Corpe to achieve the same benefits.

Applicants' claim 34, like claim 33, teaches a two-step process of heating a sheet. In addition to claimed heating step of claim 1, there is an additional preheating step. Claim 34 states "after placing a second sheet in a second frame and transferring the second sheet into a preheat oven; preheating the second sheet." Neither Holtrop, Byma, Steward, Breezer, Haardt, nor Corpe teach the benefits of a two step heating process. Additionally, claim 34 teaches a second frame.

Claims 2 and 3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop (USPN 4,529,641) in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), and Official Notice. Holtrop, in view of Byma, Steward, Breezer, Haardt, Corpe, and Official Notice, teach the subject matter of Claim 1. The Examiner cites Page 3 of Applicant's specification to show that the "first headliner part ..is substantially the shape that is visible as seen from inside the vehicle" to distinguish the first sheet of Claim 2 (visible inside vehicle) from the second sheet of Claim 3.

As to Claim 2, Holtrop is silent to the first sheet that is a low pressure, thermoformable, thermoplastic composite comprised of polypropylene and long chopped glass fibers. Haardt teaches a first sheet (2:23) that is a low pressure (3:47), thermoformable, thermoplastic composite comprised of polypropylene and reinforcing agents (2:38). Haardt teaches both first and second sheets comprised of polypropylene and reinforcing agents (2:35-39), and long glass fibers (2:59 to 3:6) used as reinforcing agent in the second sheet (3:3), and therefore it would have been obvious to one of ordinary skill

that long glass fibers also be used as the reinforcement in the first sheet. Although Haardt is silent to the long glass fibers specifically being "chopped," the Examiner takes the position that the long glass fibers are not indefinite in length, and were therefore cut to some length. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to use a first sheet that is a low pressure, thermoformable, thermoplastic composite comprised of polypropylene and long chopped glass fibers given Haardt's teaching that such a sheet has an increased rigidity in the method of Holtrop, Byma, Steward, Breezer, Haardt, Official Notice, and Applicant's admission.

As to Claim 3, Holtrop is silent to the second sheet that is a low pressure, thermoformable, thermoplastic composite comprised' of polypropylene and long chopped glass fibers. Haardt teaches a second sheet that is thermoformable, thermoplastic composite comprised of polypropylene and long glass fibers (2:59 to 3:6). Although Haardt is silent to the second sheet that is "...low pressure, thermoformable," Haardt's teaching that both sheets are comprised of polyethylene and that the first sheet is formed at reduced pressure would make it obvious to one of ordinary skill that the second sheet is also capable of being formed at reduced pressure and is therefore, "low pressure, thermoformable." Although Haardt is silent to the long glass fibers specifically being "chopped," the Examiner takes the position that the long glass fibers are not indefinite in length, and were therefore cut to some length. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to use a second sheet that is a low pressure, thermoformable, thermoplastic composite comprised of polypropylene and long chopped glass fibers, given Haardt's teaching that such a sheet has an increased rigidity, in the method of Holtrop, Byma, Steward, Breezer, Haardt, Corpe, and Official Notice.

Claims 2 and 3 are amended defining a low pressure, thermoformable, thermoplastic composite as "comprised of polypropylene and long chopped glass fibers, where said low pressure composite has a flexural modulus of about 900 MPa to about 1800 MPa as determined by ASTM D792." Claims 2 and 3 are specific examples of composites that are suitable for head impact cushioning. None of the cited prior art references teach a unified part that has at least one interior compartment with head

cushioning impact. Applicant has addressed the Official Notice. The invention achieves head impact cushioning without utilizing a compressed air bladder that is found in tennis shoes. Acoustic dampening, as taught by Holtrop, is not equivalent to impact cushioning. For instance, a concrete block has good sound dampening, but no impact cushioning. Haardt's invention employs more traditional impact modifiers, such as foam, rubber, and fused-foamed particles. Haardt does not teach that a polypropylene reinforced sheet that is a low-pressure modulus can have impact cushioning. Claims 2 and 3, currently amended, should now be allowed.

Claims 4, 5, 6, and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), and Official Notice. Holtrop in view of Byma, Steward, Breezer, Haardt, Corpe, and Official Notice. The Examiner reiterates his basis for rejecting claim 1, and particularly points out that Holtrop teaches a layer of fusing adhesive in column 3, lines 59-61, column 4, lines 16-20, and column 4, lines 33-35.

Applicants' claims 4, 5, 6, and 7 are dependent claims that cascade to dependent claim 2 and ultimately to independent claim 1. Previous arguments have been presented as to why Applicant's claim 2 should be allowed, as well as claim 1. As claims 4, 5, 6, and 7 all depend on claims 2 and 1, they have the limitations of claims 2 and 1 and, consequently, the arguments put forth for claims 2 and 1 can be appropriately applied for claims 4, 5, 6, and 7 by their dependency.

Claims 8, 25, 26, and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma, Steward, Breezer, Haardt, Corpe, Official Notice and further in view of Juriga, U.S. Patent 5,549,776. Examiner states that in col. 3, lines 19-20, and col. 6, lines 25-27, Juriga teaches a thermoform process further comprising the steps of: after heating the first sheet in the oven to the pre-determined temperature, transferring the heating first sheet to a thermoforming mold, having matched mold halves, col. 3, line 22 and Figure 4, item 142 and 144; transferring a cover stock material to the thermoforming mold having matched tabs, col. 4, lines 21-23; compressing

and fusing the cover stock material to the first sheet forming a cover first headliner part, col. 6, lines 29-33.

Juriga's patent is a self-supporting, impact-resistant laminate, which preferably includes a finished laminae and a substrate laminae, which supports the finish laminae. The substrate laminae comprises a foam layer sandwiched between two scrim layers. The substrate laminae is adhesively bonded in a face-to-face relation to each other. Preferably, a thin flexible adhesive sheet is located between the scrim and foam laminae, thereby permanently bonding the laminae together. The adhesive sheet is lightweight and flexible and relatively inexpensive, yet forms a strong durable bond between the laminae, column 2 lines 17-28. The Examiner has stated that Juriga teaches claim 8. One of the steps cited is on col. 4, lines 21-23, Juriga's patent says, "transferring a cover stock material to thermoforming mold having matched mold halves." What Juriga actually says is, "The finish laminae 28 in the disclosed embodiment includes a face fabric 30, which is bonded to a relatively thin layer of an open cell foam layer 32." The Examiner said that Juriga teaches compressing and fusing the cover stock material to the first sheet material forming a covered first headliner part, column 6, lines 29-33. What Juriga actually says is "that contour configuration of the laminae is then formed with the residual heat by placing the heated laminae in a mold and applying pressure to laminae parts 142 and 144 bringing them together under pressure, forming the preferred configuration of the resultant laminate 150." 150 is identified in Figure 4 and is a result of compressing 120. 120 identified in Figure 3 is the scrim laminate 38 and 39, the formable laminae 36a, and finished laminae 28, and the adhesive webs 40, 41, and 42 positioned between the laminae and laid in place. Applicant is quite honestly confused as to the basis of the Examiner's rejection. In Applicants' invention in claim 8, there are only <u>two</u> materials; the cover stock material and the first sheet. These two materials are compression molded and then transferred to a vacuum mold. Juriga teaches forming a laminate having at least seven (7) layers, and at no time does the resulting bonded product 150 end up in a vacuum mold. The rejection is baseless.

The Examiner has rejected claim 25 on the basis that Holtrop teaches injecting foam into the interior compartment, therefore, it would have been *prima facie* obvious to do so to help reduce the severity of head injury to passengers.

Applicant's claim 25 is dependent on claim 8, which is dependent on claim 1, therefore has all the limitations of the parent and intervening claim, claim 8. Holtrop does not teach that injecting foam into the interior compartment would help reduce the severity of head injury to passengers. In fact, Holtrop is silent on the purpose of the urethane foam. An equally rational explanation for the foam is that it would improve the stability of the corrugated article formed by Holtrop. Furthermore, claim 25 states, "after compressing the half molds of the thermoforming mold fusing the covered first headliner part to the second headliner part thereby forming a unified part; injecting foam into the interior compartment." Holtrop teaches that after the mold is closed the laminate is expanded. There is no cavity in Holtrop's invention until after expansion. Examiner has stated that Applicant does not teach a specific order. Claim 25 clearly defines when the foam is inserted, that is after compressing the half molds, and therefore it is nonsensical to say that Holtrop teaches the same process.

The Examiner has rejected claim 26 taking the position that it would have been obvious to put thermal and sound insulation into Holtrop's article.

Applicant asserts that the Examiner has made a leap that is unsupported by the priority reference Holtrop. Holtrop does not teach the use of insulation. Furthermore, claim 26 is a process claim that is dependent upon process claim 8, which depends on independent process claim, claim 1. Rejection is respectfully overcome, as the limitations of the intervening claims are not taught.

As to claim 31, Examiner admits that Holtrop is silent to this specific finishing treatment by applicant. He states, however, that Corpe teaches water-jet cutting, therefore, it would have been obvious to one of ordinary skill in the art to include a step of water-jet cutting to improve the overall appearance of the headliner, to remove it from the frame sheets, and make it fit into the vehicle.

Applicant's claim 31 reads on secondary punching, laser, water-jet and knife trimming, and vibration, ultrasonic and hot melt welding. Corpe does not teach most of these processes. Furthermore, claim 31 is dependent upon claim 8, which is dependent upon claim 1 and have all the intervening limitations of claims 1 and 8. Claim 31 is respectively allowed.

Claims 9 and 11 stand rejected by the Examiner as being unpatentable over Holtrop in view of Byma, Steward, Breezer, Haardt, Corpe, Juriga, and Official Notice. Holtrop teaches a cloth and a fabric cover stock material, which Examiner interprets to be the same as a felt. It would have been obvious to have used fabric or cloth as taught by Holtrop in the process.

Applicant's claim 9, in addition to teaching a fabric, also teaches a film, a fur, a leather, or a combination thereof. The prior art references do not refer to either a film or fur or leather or a combination of a fabric, a film, a felt, a fur, or a leather. Claim 9 is not anticipated by Holtrop.

Claim 11 stands rejected. Holtrop teaches an interlayer adhesive to promote adhesion of the fabric and the foamed thermoplastic sheet. The adhesive, as taught in the prior art reference, is to prevent the problems of layered delamination and sagging headliners.

Applicant's claim 11 is a dependent claim depending on claim 9, which as previously stated is inclusive of cover stock material comprised of materials not taught by Holtrop. Furthermore, as Examiner admits, the Holtrop patent teaches that the adhesive combines the cover stock material to a foam layer. Applicant does not claim a foam, nor teach a foam product in the specification. Claim 11 in light of the intervening claim 9, which is dependent upon claim 8, which is dependent upon claim 1, has process limitations not taught by the prior art. As previously mentioned, the Juriga patent failed to teach process step 8, wherein a headliner sheet is combined with a cover stock material and then transferred into a vacuum thermoforming mold. Juriga does not teach a similar step.

Claims 10, 12, and 21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma, Steward, Breezer, Haardt, Corpe, and Official Notice. Holtrop teaches a cover stock with an underlying layer of foam (4:17-18).

Applicants' claim 10 is a dependent claim, depending on claims 8 and 1. Claim 10 is amended to reflect that, as claimed, now there is proper antecedent basis for the cover stock material. While Holtrop teaches a layer of foam that can contain a layer of adhesive (col. 4, line 32), he does not teach a unified part comprised of foam with a cover stock material and a thermoplastic composite, wherein the unified part is made by vacuum thermoforming. Holtrop's process utilizes compression molding and expansion. Applicants' process produces at least one cavity having head impact cushioning, a layer of foam for sound dampening, a cover stock for aesthetic qualities and additional sound dampening, wherein the process is not limited to forming closed interior cavities, as an expansion process is. The sheets and cover stock are delivered in frames, and ejected using frames.

Applicants' claim 12 is dependent claim, depending on claims 7, 6, 5, 4, 2, and 1. Claim 12 is amended to reflect that, as claimed, now there is proper antecedent basis for both the first sheet and the second sheet having a fusing adhesive. While Holtrop teaches a layer of foam that can contain a layer of adhesive (col. 4, line 32), he does not teach a process that combines thermoplastic composite sheets comprised of polypropylene and long chopped glass fibers, where said low pressure composite has a flexural modulus of about 900 MPa to about 1800 MPa as determined by ASTM D792 (claim 2), where the composites are coated with an adhesive. Also, Holtrop does not teach vacuum thermoforming in combination with compression molding. The Holtrop laminate is substantially a corrugated part, where the corrugations impart strength to the laminate. As pointed out in col. 5, line 24 – 28 of Holtrop, " the headliner is hollow in the locations between roof support ribs and formed to closely conform to the interior surface of the automobile." The Examiner's analysis does not match the stated purpose of the hollow cavities. The rejection is respectfully overcome.

Applicants' claim 21 is a dependent claim, depending on claims 8 and 1, where the covered unified part is a finished headliner covered with a fabric, a film, or a felt, or a fur or a leather or a combination thereof. While Holtrop teaches a layer of foam that can contain a layer of adhesive (col. 4, line 32) and a fabric, he does not teach the process for making a unified covered part comprised of a cover stock material on a reinforced thermoplastic composite, wherein the covered unified part is made by vacuum thermoforming, and the cover stock is a fabric, a film, or a felt, or a fur, or a leather, or a combination thereof. Applicants' process utilizes a multi-step process where the steps can be run in parallel, while Holtrop's process utilizes compression molding and expansion process that is sequential. Applicants' process produces at least one cavity having head impact cushioning, while Holtrop does not teach a similar property. As previously stated in Holtrop, " the headliner is hollow in the locations between roof support ribs and formed to closely conform to the interior surface of the automobile." Another distinction is that the sheets and cover stock are delivered in frames, and ejected using frames.

Claims 13, 27, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), Official Notice, and further in view of Juriga (USNPN 5,549,776). Juriga teaches (2:55-60) an improved fiber reinforcing scrim, where the scrim is molded into the second sheet (6:29-35). As to claim 27, Holtrop teaches injecting foam into the interior compartment. As to claim 32, Corpe teaches water-jet cutting.

Applicants' claim 13 is a dependent claim depending on claim 8, which depends on Claim 1 and, therefore, has all the intervening limitations of said claims. Claim 13 claims, "after heating the second sheet in the oven to the predetermined temperature, transferring the heated first sheet to a thermoforming mold having matched mold halves; transferring a reinforcing scrim material to the thermoforming mold having matched mold halves; compressing and fusing the reinforcing scrim material to the second sheet forming a scrim reinforced second headliner part; and transferring and positioning the scrim reinforced second headliner part onto the opposing half mold of the vacuum thermoforming mold." The result of the process as claimed in claim 13 is a unified part, where the second sheet is

laminated to a scrim and the first sheet is laminated to a cover stock material, where both sheets have been formed in a first part and a second part respectively, and then the unified part through compression molding, therein forming a twin sheet headliner with interior head impact cushioning. Juriga merely teaches laminating multiple sheets (7–8) together, adhesive webs 40 and 41, scrim laminae 38 and 39, foam lamina 36, adhesive laminae 40 and 41, optional a finish lamina 38 (col. 5, lines 41 46). There is no teaching by Juriga to form a cavity. One would stretch the argument and state that, in effect, foam provides micro-cavities; however, foam is not as inexpensive as nothing, as Applicants' invention has no core. If the Examiner's argument is that Holtrop teaches the cavities, then he should look at Holtrop's invention to see if Holtrop thinks it is possible to expansion mold a laminate where each sheet has two reinforcing layers. It can't be done. The reinforcement on both sides of each sheet will prevent the sheets from deflecting. Applicant individually forms the top and bottom sheets, where each sheet has a reinforcing layer on only one side, and then combines the sheets into a unified part. The cited prior art doesn't teach this. There is nothing in the prior art that teaches head impact cushioning.

Claim 27 teaches the process as taught in claim 13, wherein the cavity is filled with foam. Claim 27 is a dependent claim, and should be allowed based on the limitations cited above.

Claim 32 teaches the process as taught in claim 13, wherein the resulting part is finished. Claim 32 is a dependent claim, and should be allowed based on the limitations cited above. Arguments for claims 13, 27, and 32 respectfully overcome the Examiner's rejections and should be allowed.

Claims 14, 15, and 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma, Steward, Breezer, Haardt, Corpe, Juriga, and Official Notice. Examiner's position is that claim 14 is obvious for reasons cited for claims 8 and 13, and that an underlying layer of foam is prima facie obvious. Claims 15 and 16 follow similar logic.

Applicant requests that the Examiner reconsider his rejections. Just how many steps away does an invention have to depart from the cited prior art before he does not consider the embodiment to be obvious. Claims 14, 15, and 16 are all dependent claims depending on claim 13, 8, and 1. Only Applicant teaches in claim 14 that the cover stock material is inclusive of an underlying layer of foam. In Fig. 3 of Juriga, the foam core 36 38 and a lower layer of has an upper layer of adhesive 40 and a lower layer of adhesive 41, an upper layer of scrim scrim 39, another layer of adhesive 42, a thinner foam core 30 and fabric 32. Applicants' invention, as claimed in claim 14, has a center layer of nothing / air 28, an upper thermoplastic sheet 38, a lower thermoplastic sheet 38', an upper layer of scrim 42 and a lower cover stock material 34 with a foam layer. Applicant has two separate sheets that are point fused. Juriga's and Applicants' invention are distinctly different, most notably in that Juriga has a center layer of foam, Applicant has none, Juriga has a single laminate, Applicant has two laminates separated by nothing / air. Claim 15 adds a layer of adhesive and does not teach that the center has nothing / air. Claim 16 teaches that fusing adhesives can be added to augment adhesion at the points that are fused. Juriga teaches away from forming a cavity and vacuum molding.

Claims 17, 18, 19, and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), Juriga (USPN 5,549,776) and Official Notice. The claims are rejected on the basis as previously enumerated for claims 14, 15 and 16.

Applicant reiterates his arguments. Claims 17, 18, 19 and 22 are all dependent claims depending on claims 8, 13 and 1 or intervening claims. See the arguments for claims 14, 15 and 16.

Claim 28 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), Juriga (USPN 5,549,776), and Official Notice. Examiner's position is that it is obvious to injecting insulation, as Holtrop teaches injecting foam into the cavity.

As to claim 28, Holtrop is silent on the purpose of the urethane foam. An equally rational explanation for the foam is that it would improve the stability of the corrugated article formed by Holtrop. Furthermore, claim 28 states "after compressing the half molds of the thermoforming mold fusing the covered first headliner part to the second headliner part thereby forming a unified part; injecting insulation into the interior compartment." Holtrop teaches that after the mold is closed the laminate is expanded. There is no cavity in Holtrop's invention until after expansion. Examiner has stated that Applicant does not teach a specific order. Claim 28 clearly defines when the insulation is inserted, that is after compressing the half molds, and therefore it is nonsensical to say that Holtrop teaches the same process. Applicant forms half cavities and then joins the half cavities. Holtrop forms a laminate that is partially fused, and then expands the laminate forming cavities. Holtrop cannot add insulation or foam until after expansion. Holtrop does not teach Applicants' process.

Claim 29 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Holtrop in view of Byma (USPN 6,322,658 Bl), Steward (USPN 4,211,590), Breezer (USPN 5,635,129), Haardt (USPN 5,180,628), Corpe (USPN 5,795,015), Juriga (USPN 5,549,776), Official Notice, and Strapazzini (USPN 5,529,742).

Applicants' claim 29, depending from 8 and claim 1, differs from Strapazzini, in that Strapazzini does not teach using compression and vacuum molding to form a covered first part (claim 8), which is then positioned in a mold with a vacuum formed second part (claim 1), where, prior to forming the covered unified part, positioning wiring, fasteners, duct work, and reinforcing components, and acoustic enhancing materials into what will become the interior compartment with head impact cushioning. Strapazzini does not teach twin sheet thermoforming, and so the reference is only marginally relevant. The Applicants' first part is joined to the second part. Strapazzini does not teach forming a cavity with a second part.

Examiner cites prior art made of record but not relied upon.

Applicants have not added any new claims. There are no fees.

In view of these Remarks and the Amendment filed herewith, the application is now believed to be in condition for allowance and such favorable action is respectfully requested on behalf of the Applicant.

Respectfully submitted,

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F. Rhett Brockington
Patent Agent for Applicant(s)
Registration No. 29,618
DOUGHERTY, CLEMENTS & HOFER
1901 Roxborough Road, Suite 300
Charlotte, North Carolina 28211
Telephone: 704/366-6642
Facsimile: 704/366-9744

Attorney's Docket 3699